EXPERIMENTAL EYE RESEARCH

Editors-in-Chief
E. A. Balazs and K. E. Eakins

Section Editors
A. Bill, L. Z. Bito, H. Bloemendal, J. G. Hollyfield, P. J. O'Brien, J. Piatigorsky and A. Spector

Editors

D. C. Beebe
J. C. Besharse
F. Bettelheim
P. Bhattacherjee
J. E. Brown
A. I. Cohen
Y. Courtois
H. Davson
G. Duncan
B. E. J. Ehinger
D. B. Farber
W. Garner
M. O. Hall
J. Harding
H. J. Hoenders
J. Horwitz
S. Iwata
B. Jacobson
M. E. Langham
R. E. Marc
D. M. Maurice
R. Meyers-Elliott
V. N. Reddy
H. Ripps
J. W. Rohen
J. C. Saari
R. Tripathi
J. A. Zadunaisky

VOLUME 43
1986

ACADEMIC PRESS

London Orlando San Diego New York
Austin Boston Sydney Tokyo Toronto
Harcourt Brace Jovanovich, Publishers

Copyright © 1986 by Academic Press Inc. (London) Ltd.
ALL RIGHTS RESERVED

No part of this volume may be produced in any form, by photostat, microfilm, or any other means, without written permission from the publishers.

Printed in Great Britain

CONTENTS OF VOLUME 43

Number 1, July 1986

Newsome, D. A. and Fishman, G. A. Research update: Report on Retinitis Pigmentosa and the Immune System Workshop 7–8 November 1985 1

Williams, R. N. and Paterson, C. A. Modulation of Corneal Lipoxygenase by Ascorbic Acid 7

DiMattio, J. and Streitman, J. Facilitated Glucose Transport across the Retinal Pigment Epithelium of the Bullfrog (*Rana catesbiana*) 15

Patek, C. E., Vornhagen, R., Rink, H. and Clayton, R. M. Developmental Changes in Membrane Protein Expression by Chick Lens Cells In Vivo and In Vitro and the Detection of Main Intrinsic Polypeptide (MIP) 29

Chan, L. S., Li, W., Khatami, M. and Rockey, J. H. Actin in Cultured Bovine Retinal Capillary Pericytes: Morphological and Functional Correlation 41

Pasantes-Morales, H., Domínguez, L., Campomanes, M. A. and Pacheco, P. Retinal Degeneration Induced by Taurine Deficiency in Light-deprived Cats 55

Woodward, D. F., Chen, J., Padillo, W. and Ruiz, G. Pharmacological Characterization of β-Adrenoceptor Subtype Involvement in the Ocular Hypotensive Response to β-Adrenergic Stimulation 61

Summers, L. J., Slingsby, C., Blundell, T. L., den Dunnen, J. T., Moormann, R. J. M. and Schoenmakers, J. G. G. Structural Variation in Mammalian γ-Crystallins Based on Computer Graphics Analyses of Human, Rat and Calf Sequences 1. Core Packing and Surface Properties 77

Degenstein, L. and Moscona, A. A. Retinoic Acid Inhibits Conversion of Dissociated Müller Glia into Lens-like Cells 93

Collier, N. C. and Schlesinger, M. J. Induction of Heat-shock Proteins in the Embryonic Chicken Lens 103

Yoshitomi, T. and Ito, Y. Pre-synaptic Actions of Noradrenaline on the Dog Ciliary Muscle Tissue 119

McMenamin, P. G. and Lee, W. R. Effects of Prolonged Intracameral Perfusion with Mock Aqueous Humour on the Morphology of the Primate Outflow Apparatus 129

Number 2, August 1986

Hayasaka, S., Fukuyo, T., Hara, S., Makazawa, M. and Mizuno, K. Acid Lens-protein-degrading Activity in Aqueous Humor 143

Bruinink, A., Dawis, S., Niemeyer, G. and Lichtensteiger, W. Catecholaminergic Binding Sites in Cat Retina, Pigment Epithelium and Choroid 147

Bilbaut, T., Gachon, A. M. and Dastugue, B. Deposits on Soft Contact Lenses. Electrophoresis and Scanning Electron Microscopic Examinations 153

Khatami, M., Roel, L. E., Li, W. and Rockey, J. H. Ascorbate Regeneration in Bovine Ocular Tissues by NADH-dependent Semi-dehydroascorbate Reductase 167

Crabbe, M. J. C., Jordan, R. M., Ting, H.-H. and Hoe, S. T. Bovine Lens Aldehyde Dehydrogenase: Activity and Non-linear Steady-state Kinetics 177

Castoro, J. A. and Bettelheim, F. A. Distribution of the Total and Non-freezable Water in Rat Lenses 185

Long, K. O., Fisher, S. K., Fariss, R. N. and Anderson, D. H. Disc Shedding and Autophagy in the Cone-dominant Ground Squirrel Retina 193

Pautler, E. L. and Tengerdy, C. Transport of Acidic Amino Acids by the Bovine Pigment Epithelium 207

Yousufzai, S. Y. K., Akhtar, R. A. and Abdel-Latif, A. A. Effects of Substance P on Inositol Triphosphate Accumulation, on Contractile Responses and on Arachidonic Acid Release and Prostaglandin Biosynthesis in Rabbit Iris Sphincter Muscle 215

Uehara, F., Muramatsu, T. and Ohba, N. Two-dimensional Gel Electrophoretic Analysis of Lectin Receptors in the Bovine Interphotoreceptor Matrix 227
Wilson, W. S. and McKean, C. E. Regional Distribution of Acetylcholine and Associated Enzymes and their Regeneration in Corneal Epithelium 235
Wolfe, J. K. and Chylack, L. T., Jr. Glucose metabolism by Human Cataracts in Culture 243
Ikebe, H., Takamatsu, T., Itoi, M. and Fujita, S. Age-dependent Changes in Nuclear DNA Content and Cell size of Presumably Normal Human Corneal Endothelium 251
Grubb, B. R., Driscoll, S. M. and Bentley, P. J. Exchanges of Lead In Vitro by the Rabbit Crystalline Lens 259
Goldman, S. S. and Witkovsky, P. Glycogen Metabolism in an Amphibian Retina 267
Letters to the Editors
Melamed, S., Freddo, T. F. and Epstein, D. L. Use of Cationized Ferritin to Trace Aqueous Humor Outflow in the Monkey Eye 273
Stone, R. A., Kuwayama, Y., Terenghi, G. and Polak, J. M. Calcitonin Gene-related Peptide: Occurrence in Corneal Sensory Nerves 279
McDevitt, D. S., Hawkins, J. W., Jaworski, C. J. and Piatigorsky, J. Isolation and Partial Characterization of the Human aA-Crystallin Gene 285

Number 3, September 1986

Siezen, R. J., Anello, R. D. and Thomson, J. A. Interactions of Lens Proteins. Concentration Dependence of β-Crystallin Aggregation 293
Linklater, H. A., Dzialoszynski, T., McLeod, H. L., Sanford, S. E. and Trevithick, J. R. Modelling Cortical Cataractogenesis VIII: Effects of Butylated Hydroxytoluene (BHT) in Reducing Protein Leakage from Lenses in Diabetic Rats 305
Sen, P. C., Krebsbach, R. J. and Pfeiffer, D. R. Persistent Stimulation of Lens Fiber Cell Na,K-ATPase by Sodium Thiocyanate 315
Willis, J. A. and Schleich, T. The Effect of Prolonged Elevated Glucose Levels on the Phosphate Metabolism of the Rabbit Lens in Perfused Organ Culture 329
Koide, H., Suganuma, T, Murata, F. and Ohba, N. Ultrastructural Localization of Lectin Receptors in the Monkey Retinal Photoreceptors and Pigment Epithelium: Application of Lectin–Gold Complexes on Thin Sections 343
Savion, N. and Farzame, N. Characterization of the Na,K-ATPase Pump in Cultured Bovine Corneal Endothelial Cells 355
Crean, E. V., Tyson, S. L. and Richardson, T. M. Factors Influencing Glycosaminoglycan Synthesis by Calf Trabecular Meshwork Cell Cultures 365
Nguyen, B. Q. and Fife, R. S. Vitreous Contains a Cartilage-related Protein 375
Holmes, R. S. and Vandeberg, J. L. Ocular NAD-Dependent Alcohol Dehydrogenase and Aldehyde Dehydrogenase in the Baboon 383
Bunt-Milam, A. H., Black, R. A. and Bensinger, R. E. Breakdown of the Outer Blood–Retinal Barrier in Experimental *Commotio Retinae* 397
Porrello, K., Yasumura, D. and LaVail, M. M. The Interphotoreceptor Matrix in RCS Rats: Histochemical Analysis and Correlation with the Rate of Retinal Degeneration 413
Schalken, J. J. and De Grip, W. J. Enzyme-linked Immunosorbent Assay for Quantitative Determination of the Visual Pigment Rhodopsin in Total-eye Extracts 431
Kaufman, P. L. Total Iridectomy Does Not Alter Outflow Facility Responses to Cyclic AMP in Cynomolgus Monkeys 441
Campochiaro, P. A. and Glaser, B. M. A Retina-derived Stimulator(s) of Retinal Pigment Epithelial Cell and Astrocyte Proliferation 449
Gospodarowicz, D., Massoglia, S., Cheg, J. and Fujii, D. K. Effect of Retina-derived Basic and Acidic Fibroblast Growth Factor and Lipoproteins on the Proliferation of Retina-derived Capillary Endothelial Cells 459

Ng, M. C. and Schichi, H. Purification and Properties of Glutathione Reductases from Bovine Ciliary Body 477

Number 4, October 1986

Grierson, I., Boulton, M., Hiscott, P., Hitchins, C., Gilbert, D. and McLeod, D. Human Retinal Pigment Epithelial Cells in the Vitreous of the Owl Monkey 491
Crean, E. V., Sherwood, M. E., Casey, R., Miller, M. W. and Richardson, T. M. Establishment of Calf Trabecular Meshwork Cell Cultures 503
Traas, J. and Ramaekers, F. The Membrane-associated Cytoskeleton in Cultured Lens Cells. Electron Microscopical Visualization in Cleaved Whole-mount Preparations and Platinum Replicas 519
McMenamin, P. G., Dutton, G. N., Hay, J. and Cameron, S. The Ultrastructural Pathology of Congenital Murine Toxoplasmic Retinochoroiditis. Part I: the Localization and Morphology of *Toxoplasma* Cysts in the Retina 529
Dutton, G. N., McMenamin, P. G., Hay, J. and Cameron, S. The Ultrastructural Pathology of Congenital Murine Toxoplasmic Retinochoroiditis. Part II: the Morphology of the Inflammatory Changes 545
Katz, M. L., Drea, C. M., Eldred, G. E., Hess, H. H. and Robinson, W. G., Jr. Influence of Early Photoreceptor Degeneration on Lipofuscin in the Retinal Pigment Epithelium 561
Nguyen-Legros, J., Martin-Martinelli, E., Simon, A., Denoroy, L. and Vigny, A. Co-localization of Tyrosine Hydroxylase and Phenylethanolamine-*N*-methyltransferase Immunoreactivity in the Rat Retina: a Re-examination using Double Labeling on Semi-thin Sections 575
Pourcho, R. G. and Osman, K. Acetylcholinesterase Localization in Cat Retina: a Comparison with Choline Acetyltransferase 585
Patek, C. E. and Clayton, R. M. Alterations in Crystallin Gene Expression during Subculture of Chick Lens Cells 595
Khatami, M., Stramm, L. E. and Rockey, J. H. Ascorbate Transport in Cultured Cat Retinal Pigment Epithelial Cells 607
Coca-Prados, M. and Chatt, G. Growth of Non-pigmented Ciliary Epithelial Cells in Serum-Free Hormone-supplemented Media 617
Sellner, P. A. The Movement of Organic Solutes between the Retina and Pigment Epithelium 631
Stjernschantz, J., von Dickhoff, K., Oksala, O. and Seppa, H. A Study of the Mechanism of Ocular Irritation Following YAG Laser Capsulotomy in Rabbits 641
Johansson, J.-O. Retrograde Axoplasmic Transport in Rat Optic Nerve In Vivo. What Causes Blockage at Increased Intraocular Pressure? 653
Takemoto, L. and Takehana, M. Major Intrinsic Polypeptide (MIP26K) from Human Lens Membrane: Characterization of Low-molecular-weight Forms in the Aging Human Lens 661
Srivastava, S. K., Ansari, N. H. and Lerman, S. Purification of the Bovine Lens Isozymes Which Reduce Fructose Diphosphate to Sorbitol Diphosphate 669
Allen, L. A. and Gerritsen, M. E. Regulation of Hexose Transport in Cultured Bovine Retinal Microvessel Endothelium by Insulin 679
Letter to the Editors
Uehara, F., Sameshima, M., Muramatsu, T. and Ohba, N. Affinity Isolation of Cone Outer Segments Using a Peanut Agglutinin–Nitrocellulose Sheet 687

Number 5, November 1986

Steinberg, R. H. Research update: Report from a Workshop on Cell Biology of Retinal Detachment 695
Beekhuis, W. H. and McCarey, B. E. Corneal Epithelial Cl-dependent Pump Quantified 707

Araki, M. and Saito, T. Alterations in the Differentiation of Chick Retina Caused by an Intraocular Injection of an Alkaline Phosphatase Inhibitor 713

Barbehenn, E. K., Klotz, K. L., Noelker, D. M., Nelson, R., Chader, G. J. and Passonneau, J. V. In Vivo cGMP Levels in Frog Photoreceptor Cells as a Function of Light Exposure 729

Gregory, R. L. and Allansmith, M. R. Naturally Occurring IgA Antibodies to Ocular and Oral Microorganisms in Tears, Saliva and Colostrum: Evidence for Common Mucosal Immune System and Local Immune Response 739

Batey, D. W., Mead, J. F. and Eckhert, C. D. Lipids of the Retinal Pigment Epithelium in RCS Dystrophic and Normal Rats 751

Zuazo, A., Ibañez, J. and Belmonte, C. Sensory Nerve Responses Elicited by Experimental Ocular Hypertension 759

Rubin, L. J. and Nolte, J. F. Cyclic Nucleotide Levels of the Photosensitive Irises of *Bufo marinus* and *Lophius* 771

Sandberg, M. A., Pawlyk, B. S. and Berson, E. L. Electroretinogram (ERG) Sensitivity and Phagosome Frequency in the Normal Pigmented Rat 781

Smith, S. B. and Yielding, K. L. Retinal Degeneration in the Mouse. A Model Induced Transplacentally by Methylnitrosourea 791

Gregerson, D. S., Fling, S. P. and Wohlhueter, R. M. Characterization of Immunologically Active Cyanogen Bromide Peptide Fragments of Bovine and Human Retinal S-Antigen 803

Kaufman, P. L. Effects of Intracamerally Infused Prostaglandins on Outflow Facility in Cynomolgus Monkey Eyes with Intact or Retrodisplaced Ciliary Muscle 819

Winkler, B. S., Desantis, N. and Solomon, F. Multiple NADPH-producing Pathways Control Glutathione (GSH) Content in Retina 829

Nilsson, S. F. E., Sperber, G. O. and Bill, A. Effects of Vasoactive Intestinal Polypeptide (VIP) on Intraocular Pressure, Facility of Outflow and Formation of Aqueous Humor in the Monkey 849

Letters to the Editors

Lohmann, W., Schmehl, W. and Strobel, J. Nuclear Cataract: Oxidative Damage to the Lens 859

Tripathi, B. J., Tripathi, R. C., Stefansson, K., Havran, W. L. and Fitch, F. W. Monoclonal Antibodies to Human Trabecular Endothelium. A Preliminary Report on Production and Characterization 863

Lavail, M. M. and Lawson, N. R. Development of a Congenic Strain of Pigmented and Albino Rats for Light Damage Studies 867

Number 6, December 1986

Szél, Á., Takács, L., Monostori, É., Diamantstein, T., Vigh-Teichmann, I. and Röhlich, P. Monoclonal Antibody-recognizing Cone Visual Pigment 871

Gherezghiher, T., March, W. F., Nordquist, R. E. and Koss, M. C. Laser-induced Glaucoma in Rabbits 885

Szél, Á., Röhlich, P. and Govardovskii, V. Immunocytochemical Discrimination of Visual Pigments in the Retinal Photoreceptors of the Nocturnal Gecko *Teratoscincus Scincus* 895

Costagliola, C., Iuliano, G., Menzione, M., Rinaldi, E., Vito, P. and Auricchio, G. Effect of Vitamin E on Glutathione Content in Red Blood Cells, Aqueous Humor and Lens of Humans and Other Species 905

Penn, J. S. and Williams, T. P. Photostasis: Regulation of Daily Photon-catch by Rat Retinas in Response to Various Cyclic Illuminances 915

St Jules, R. S. and O'Brien, P. J. The Acylation of Rat Rhodopsin In Vitro and In Vivo 929

Wetzel, M. G. and O'Brien, P. J. Turnover of Palmitate, Arachidonate and Glycerol in Phospholipids of Rat Rod Outer Segments 941

Ortwerth, B. J., Olesen, P. R. and Sharma, K. K. Solubilization of the Lens Water-insoluble Fraction by Sonication 955

Fagerholm, P., Lundevall, E., Trocmé, S. and Wroblewski, R. Human and Experimental Lens Repair and Calcification 965

Lewis, R. A., Rixon, K. C. and Harding, J. J. Bendazac Prevents Cyanate Binding to Soluble Lens Proteins and Cyanate-induced Phase-separation Opacities In Vitro: a Possible Mechanism by Which Bendazac Could Delay Cataract 973

Kishida, K., Miwa, Y. and Iwata, C. 2-Substituted 1,3,4-Thiadiazole-5-sulfonamides as Carbonic Anhydrase Inhibitors: Their Effects on the Transepithelial Potential Difference of the Isolated Rabbit Ciliary Body and on the Intraocular Pressure of the Living Rabbit Eye 981

Geller, A. M., Kotb, M. Y. S., Jernigan, H. M., Jr and Kredich, N. M. Purification and Properties of Rat Lens Methionine Adenosyltransferase 997

Albrecht-Buehler, G. and Rafferty, N. S. Light Conductance in the Ocular Lens 1009

Bessems, G. J. H., de Man, B. M., Bours, J. and Hoenders, H. J. Age-related Variations in the Distribution of Crystallins within the Bovine Eye 1019

Richardson, N. A. and McAvoy, J. W. Analysis of an Inductive Interaction between Lens and Neural Retina in Rats of Different Ages 1031

Palkama, A., Kaufman, H., Uusitalo, R. and Uusitalo, H. Histochemistry of Adenylate Cyclase Activity in the Anterior Segment of the Eye: a Methodological Evaluation with Biochemical Background 1043

Groth-Vasselli, B. and Farnworth, P. N. A Critical Maturation Period in Neonatal-rat-lens Development 1057

Varma, S. D., Morris, S. M., Bauer, S. A. and Koppenol, W. H. In Vitro Damage to Rat Lens by Xanthine–Xanthine Oxidase: Protection by Ascorbate 1067

Day, J., Grierson, I., Unger, W. G. and Robins, E. Some Effects of Phagocytosis on Bovine Meshwork Cells in Culture 1077

Gerritsen, M. E., Weinstein, B. I., Gordon, G. G. and Southren, A. L. Prostaglandin Synthesis and Release from Cultured Human Trabecular-meshwork Cells and Scleral Fibroblasts 1089

Keeting, P. E., Dong, D-S., Lysz, T. W. and Fu, S.-C. J. Rat Lens Prostaglandin Biosynthesis During Galactose-induced Cataractogenesis 1103

Patek, C. E. and Clayton, R. M. Patterns of Crystallin Expression During Differentiation In Vitro of Several Chick Genotypes with Different Effects on Lens Cell Growth Rate 1111

Letters to the Editors

Patmore, L. and Maraini, G. A Comparison of Membrane Potentials, Sodium and Calcium Levels in Normal and Cataractous Human Lenses 1127

Varma, S. D. and Glaros, D. Photostimulation of the HMP Shunt in Human Retinal Pigment Epithelium 1131

Bessems, G. J. H. and Hoenders, H. J. The Concentration-dependent Aggregation of Calf and Human Crystallins 1135

Wagner, B. J., Margolis, J. W., Garland, D. and Roseman, J. E. Bovine Lens Neutral Proteinase Preferentially Hydrolyses Oxidatively Modified Glutamine Synthetase 1141